

ANALYSIS OF SELECTED HAND ANTHROPOMETRIC MEASUREMENTS AMONG SOUTH WEST ZONE INTER UNIVERSITY MALE HANDBALL PLAYERS

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DOI: 10.26524/1343

Abstract: The purpose of this study was to analyse the selected hand anthropometric measurements among south zone inter university male handball players. The selected players right and left hand length and width were measured on 144 male handball players who had right hand as dominant hand. These players took part in south west zone inter university handball tournament for the year 2010-2011 organized by S.R.T.M University, Nanded, Maharashtra. In this study data was collected from teams who reached quarter finals and Annamalai University team. The hand length and width was selected as criterion variable and measured by vernier caliper, gulick tape and measuring scale. The collected data was analysed using ANOVA, when F is found to be significant Tukey HSD post hoc test was applied. The result of the study showed that right hand length ($F = 1.61, p = 0.126$) and left hand length ($F = 1.19, p = 0.308$) show no significant difference between the groups. However, right hand width ($F = 5.450, p = 0.000$) and left hand width ($F = 6.302, p = 0.000$). It shows that Rajasthan university handball players showed greater hand width on both hands than other team players. It can be concluded that hand width shows significant variations among the south west zone inter university handball tournament. The criterion variables which are selected in the present study show significant impact on gripping the ball.

Keywords: Grip strength, hand length, hand width, handball, players

Introduction

Handball is a fast body contact team game. Handball players require greater grip strength to hold the ball which prevents fumble and fall. In order avoid fumble and fall they require better hand anthropometric measurements. Human beings possess different hand anthropometric dimensions either narrow or broad which are distributed in the normal population, with slight male/female differences in the median and range values. One such dimension with these gender differences is hand shape. Hand shape has been defined in various ways, but often as simply the hand width/hand length ratio (W/L ratio). Thus hands with varying W/L ratios can be described as „long and narrow“, „average looking“, or „relatively square“ by how long the hand is in relation to the width of the palm [1].

Numerous hand-grip strength studies with healthy adults have shown that anthropometric variables, such as height, weight, hand length, and hand width, are positively associated with grip strength, as are other anatomical variations, such as the presence of a flexor digitorum superficialis tendon in the little finger. Paediatric studies have shown that the anthropometric variables of body mass index, height, weight, hand length, palm length and palm width are highly correlated with grip strength in children [1]. Though literature related to anthropometric characteristics of handball players are available, information in India context is scanty in this regard. To fulfill the lacunae of literature, the present study was planned. The purpose of this study was to analyse the selected hand anthropometric measurements among south zone inter university male handball players.

METHODS

Subjects and Variable

In this study the selected one hundred and forty four (144) male handball players, selected from south west inter university, handball tournament for the year 2010-2011, organized by S.R.T.M. University, Nanded, Maharashtra. In this study data was collected from teams who reached quarter finals and Annamalai University team. These selected subjects, who practice handball regularly and take part in competition. The mean \pm SD of age, height, weight and BMI were 21.42 ± 1.82 year, 1.76 ± 0.074 m, 66.0 ± 9.26 kg and 21.58 ± 2.27 respectively on average, the players had 5.9 ± 2.1 year of playing experience and represented various format of competition. The variable selected in this study was right and left hand length and width which were measured by vernier caliper, gulick tape and measuring scale. *Statistical techniques*

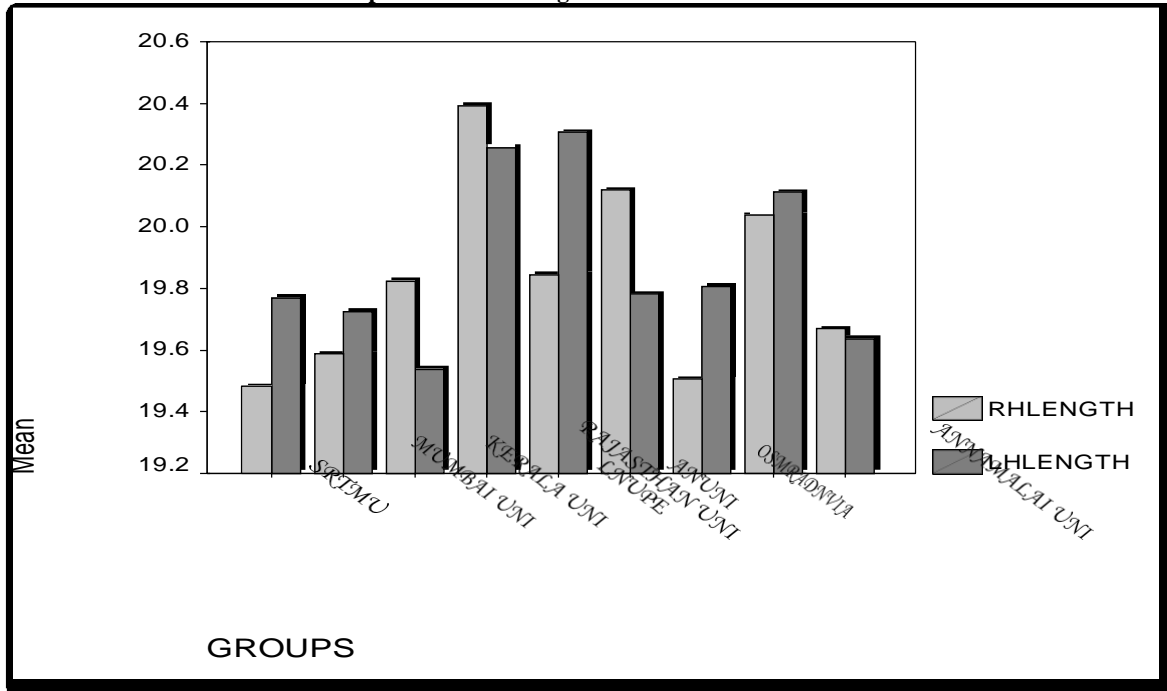
The selected hand grip strength was statistically examined by applying analysis of variance (ANOVA). When F ratio was found significant, Tukey HSD post hoc test was applied. This statistical work was done with help of SPSS 11.5 version and out puts reproduced as it is.

Result

The mean value and standard deviation on right and left hand length of various handball teams who reached quarter final in south west zone inter university handball tournament for the year 2010-2011 are presented in figure 1.

Figure 1

Graph shows hand length of various handball teams



It is clear from Table 1 that the obtained F ratio 1.614 and 1.192 ($p > .126$ and $.308$) respectively is less than the table value of 2.51 required at 8 and 144 degree of freedom for 0.05 level of confidence. It denotes that hand length of handball players remains same among the groups. Since F is not significant Tukey HSD post hoc test was not applied.

Table 1
ANOVA estimate for handball players on hand width

Variable	SOV	Sum of Squares	df	Mean Square	F	Sig.
Right hand length	Between Groups	12.091	8	1.511	1.61	.126
	Within Groups	126.386	135	.936		
	Total	138.477	143			
Left hand length	Between Groups	9.680	8	1.210	1.19	.308
	Within Groups	137.039	135	1.015		
	Total	146.719	143			

*significant at 0.05 level of confidence

However, it is clear from Table 2 that the obtained F ratio 5.45 and 6.30 ($p < .000$ and $.000$) respectively is greater than the table value of 2.51 required at 8 and 144 degree of freedom for 0.05 level of confidence. It denotes that hand width of handball players significantly differ among the groups.

Table 2
ANOVA estimate for handball players on hand width

Variable	SOV	Sum of Squares	df	Mean Square	F	Sig.
Right hand width	Between Groups	7.279	8	.910	5.450*	.000
	Within Groups	22.539	135	.167		
	Total	29.818	143			
Left hand width	Between Groups	8.556	8	1.069	6.302*	.000
	Within Groups	22.910	135	.170		
	Total	31.466	143			

*significant at 0.05 level of confidence

Since F is significant Tukey HSD post hoc test was applied and presented in Table 3. Tukey HSD post hoc test revealed significant differences on right hand width between MU and RU ($p < .013$), KU and OU ($p < .026$), RU and ANU ($p < .003$), RU and OU ($p < .000$), LNUPE and ANU ($p < .020$), LNUPE and OU ($p < .000$), OU and RDVU ($p < .030$). Remaining comparisons showed no significant difference on right hand width.

Similarly on left hand width between SRTU and RU ($p < .028$), MU and RU ($p < .047$), RU and ANU ($p < .000$), RU and OU ($p < .000$), LNUPE and ANU ($p < .022$), LNUPE and OU ($p < .000$). Remaining comparisons showed no significant difference on left hand width. Graphically hand width of various handball teams is presented in Figure 2.

Figure 2
Graph shows hand width of various handball teams

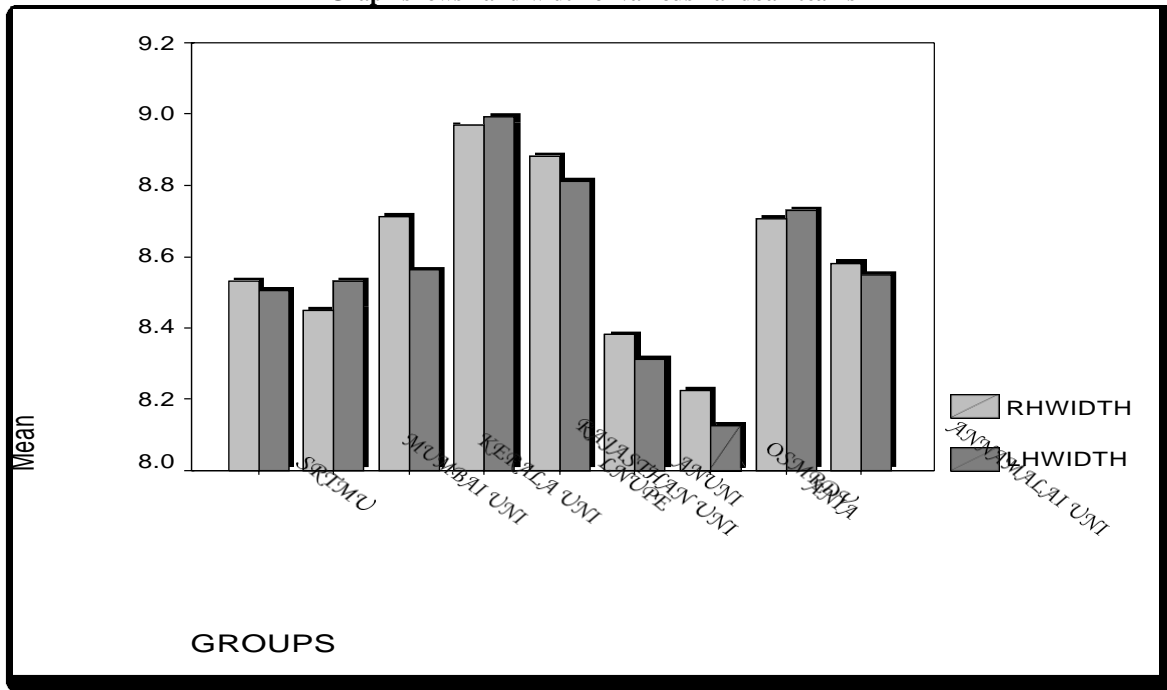


Table 3
Tukey HSD post hoc test on hand width

Team	Teams to be compared	Right hand			Left han		
		Sig.	95% Confidence Interval		Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound		Upper Bound	Lower Bound
SRTU	MU	= 1.00	-.3742	.5367	= 1.00	-.4842	.4342
	KU	= .942	-.6367	.2742	= 1.00	-.5154	.4029
	RU	= .070	-.8930	.0180	< .028	-.9467	-.0283
	LNUPE	= .280	-.8055	.1055	= .476	-.7654	.1529
	ANU	= .981	-.3055	.6055	= .920	-.2654	.6529
	OU	= .464	-.1492	.7617	= .189	-.0779	.8404
	RDVU	= .953	-.6305	.2805	= .832	-.6842	.2342
MU	AU	= 1.00	-.5055	.4055	= 1.00	-.5029	.4154
	KU	= .671	-.7180	.1930	= 1.00	-.4904	.4279
	RU	< .013	-.9742	-.0633	< .047	-.9217	-.0033
	LNUPE	= .079	-.8867	.0242	= .594	-.7404	.1779
	ANU	= 1.00	-.3867	.5242	= .853	-.2404	.6779
	OU	= .826	-.2305	.6805	= .128	-.0529	.8654
	RDVU	= .699	-.7117	.1992	= .906	-.6592	.2592
KU	AU	= .992	-.5867	.3242	= 1.00	-.4779	.4404
	RU	= .699	-.7117	.1992	= .084	-.8904	.0279
	LNUPE	= .962	-.6242	.2867	= .735	-.7092	.2092
	ANU	= .354	-.1242	.7867	= .735	-.2092	.7092
	OU	< .026	.0320	.9430	= .075	-.0217	.8967
	RDVU	= 1.00	-.4492	.4617	= .964	-.6279	.2904
	AU	= .992	-.3242	.5867	= 1.00	-.4467	.4717
RU	LNUPE	= 1.00	-.3680	.5430	= .945	-.2779	.6404
	ANU	< .003	.1320	1.0430	< .000	.2221	1.1404
	OU	< .000	.2883	1.1992	< .000	.4096	1.3279
	RDVU	= .671	-.1930	.7180	= .681	-.1967	.7217
	AU	= .164	-.0680	.8430	= .067	-.0154	.9029
LNUPE	ANU	< .020	.0445	.9555	< .022	.0408	.9592
	OU	< .000	.2008	1.1117	< .000	.2283	1.1467
	RDVU	= .953	-.2805	.6305	= 1.00	-.3779	.5404
ANU	AU	= .494	-.1555	.7555	= .681	-.1967	.7217
	OU	= .976	-.2992	.6117	= .933	-.2717	.6467
	RDVU	= .380	-.7805	.1305	= .104	-.8779	.0404
OU	AU	= .902	-.6555	.2555	= .786	-.6967	.2217
	RDVU	< .030	-.9367	-.0258	= .002	-1.0654	-.1471
	AU	= .258	-.8117	.0992	= .094	-.8842	.0342
RDVU	AU	= .994	-.3305	.5805	= .945	-.2779	.6404

* The mean difference is significant at the .05 level.

Discussion

In our study it was reported that among nine teams they differ significantly in hand width. Earlier studies reported that body height, body mass, palm span and palm length were important for the performance enhancement of athletes and were considered as basic criterion for their selection in various playing positions [2, 3]. Skoufas (2003) reported that wider palm span and longer palm length influenced specific motor abilities such as dribble, passing, catching and ball throwing and contributed to maximizing throwing velocity [4].

The present study was conducted to compare hand length and width among inter university handball players. The major conclusion drawn from this study was that hand width showed significant difference between various handball team. Hand dimensions may influence handgrip strength and the athletes have biomechanical advantages [5]. Hager-ross and Schieber (2000), investigating children at different ages, confirmed that hand length (the distance from wrist joint to the tip of middle finger) is an important variable for handgrip strength [6]. Visnapuu and Jürimäe (2007) indicated that hand perimeters are the most important hand anthropometric variables in relation to handgrip strength. The present study showed that difference in hand width among handball players [5].

Conclusions

There was no difference in hand length among the selected handball team. On the other hand, Rajasthan University players dominated in right and left hand width. They possess biomechanical advantages than other teams and which influences the grip strength.

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